

REMARKS

Prior to this paper, claims 1-7 and 10-15 were pending in the present application. By this paper, no claims are cancelled, and claims 16-18 are added. Therefore, claims 1-7 and 10-18 are pending in the present application.

Applicants respectfully submit that the present application is in condition for allowance for the reasons that follow.

Power of Attorney

Applicants refer to the signed Power of Attorney form filed with the paper filed on November 07, 2003 to permit the law firm of Foley and Lardner to prosecute the present application.

Applicants request that Examiner Fiorilla contact Applicants' representatives at (202) 295-4747 if an examiner's amendment is needed to place the case into allowance.

However, Applicants again request that all other future correspondence concerning this application be sent to:

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Amendment to the Title

As seen above, Applicants have amended the title per section 3 of the Office Action. Reconsideration is respectfully requested.

Objection to Claim 7 Under 37 C.F.R. §1.75(c)

Claim 7 stands objected to as failing to further limit the subjected matter of a previous claim. Applicants hereby amend claim 7, as seen above, and respectfully request reconsideration.

Obviousness-Type Double Patenting Provisional Rejections

Claims 1, 3 and 5 were provisionally rejected under the judicially created doctrine of obviousness-type double patenting in view of co-pending application number 09/962,526 in view of Sugiyama (USP 6,080,445). In response, Applicants submit a terminal disclaimer along with this letter, and respectfully request withdrawal of the rejections in view of the terminal disclaimer.

Claim Rejections Under 35 U.S.C. §103(a)

In the Office Action, Claims 1, 3-6 and 11 are rejected under 35 U.S.C. §103(a) as being unpatentable over Huggins (U.S. Patent No. 5,741,842) in view of Sugiyama (U.S. Patent No. 6,080,445) and the article entitled *Principles of Ceramics*. Further, claims 2, 10 and 12-15 are rejected under 35 U.S.C. §103(a) in view of the just identified combination when further combined with Croft (USP 6,409,463). Applicants respectfully traverse the rejections as to the claims above, and submit that these claims are allowable for at least the following reasons.

Applicants rely on MPEP § 2143, which states that:

[t]o establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

It is respectfully submitted that the first, second and third criteria of MPEP § 2143 have not been met in the Office Action.

The Cited References Do Not Suggest All Claim Recitations

Even if the first requirement of MPEP § 2143 was satisfied in the Office Action (which it is not, as explained below), the cited references still do not meet the third requirement, which is that “the prior art reference (or references when combined) must teach or suggest all the claim limitations.”

Claim 1 recites the action of “forming said thermoplastic compound into green **semiconductor wire bonding tools** or blanks.” (Claim 1, step “c”, emphasis added.) That is, the method of claim 1 requires the action of forming tools (or blanks for tools) used to bond semiconductor wires. Claims 6 and 11 further recite claimed exemplary embodiments of the invention, such as semiconductor wire bonding capillaries (claim 6) and semiconductor wire bonding wedges (claim 11). The figures of the present application illustrate exemplary configurations of such tools. It is appreciated by the skilled artisan that such tools are extremely small.

The Office Action correctly recognizes that Huggins “does not specifically recite that the product formed [by the teachings of Huggins] is used as a tool or blank for a tool for use in the assembly and interconnection of semiconductor chips.” (Office Action, page 4, lines 17-18.) In an attempt to remedy this deficiency, the Office Action sites Sugiyama, stating that Sugiyama “discloses the use of ceramic materials in tools for **handling** semiconductor chips.” (Office Action, page 18-19, emphasis added.) Applicants recognize that Sugiyama does indeed teach the production of ceramic tools for **handling** semiconductor wafers and chips. (Sugiyama, col. 1, lines 30-40.) However, Applicants assert that this is not the same as producing tools for **semiconductor wire bonding** or blanks for forming such tools. The tools contemplated by Sugiyama are tools “such as **a transfer arm** and the like for transferring semiconductor wafers and chips so as not to contaminate the semiconductor wafers and chips.” (Sugiyama, col. 1, lines 34-35, emphasis added.) That is, the tools of Sugiyama are used to grip, manipulate and place wafers and chips onto circuit boards; the

tools of Sugiyama are not used to **bond** the wires of semiconductors. This is not simply an obvious difference. The skilled artisan would immediately recognize that tools for manipulating an entire semiconductor wafer are far more larger than the bonding tools taught by Applicants, which, by way of example, have bonding tip dimensions of about 75 micrometers.

Not only does the combination of Sugiyama with Huggins fail to teach each element of claim 1, it also **fails**, as inferred above, **to teach each element of claims 6 and 11**. That is, the combination fails to teach semiconductor wire bonding capillaries (claim 6) and semiconductor wire bonding wedges (claim 11). Neither of the cited references disclose or suggest such features. Because the article entitled Principles of Ceramics Processing does not remedy the above identified deficiencies of either Huggins or Sugiyama, claims 1, 6 and 11 are allowable, as well as the claims that depend therefrom.

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Claims 2, 10 and 12-15 are rejected in view of the above identified combination when further combined with Croft. These claims further recite dimensional features of the present invention. Specifically, these claims recite that boreholes of the dense end products obtained from the green tools or blanks obtained in claim 1 have diameters of about 10 micrometers or less. These are very, very small diameters; **diameters of a distance equivalent to about 1/10th the thickness of a sheet of paper!**

The Office Action relies on Croft to teach the dimensional recitations of the claims, even though Croft does not specifically teach dimensions. Applicants respectfully submit that Croft suffers from the same deficiencies as Sugiyama. Namely, that Croft is directed towards handling semiconductor substrates. The hole of Croft is a vacuum port 18 that imparts a vacuum between plate 12 and a substrate of a semiconductor being handled by the device of croft. Thus, Croft, like Sugiyama, fails to teach the formation of a ***semiconductor wire bonding*** tool or a blank for such a tool.

Furthermore, while the Office Action correctly recognizes that Croft teaches vacuum holes, Croft does not teach the dimensions as claimed, even after routine experimentation is

taken into account. As noted above, the diameter of the claimed boreholes is about 1/10th the thickness of a sheet of paper. This is very small, far smaller than anything that would be contemplated or even experimented with by the ordinary artisan when furnished with the teachings of Croft, Sugiyama, and Huggins. Assuming *arguendo* that the proffered combination taught each and every element other than the claimed dimensions, the use of such a small hole would be inventive and not obvious. That is, the use of such a small hole in view of these references would be done by the innovator; not the ordinary artisan.

The Office Action recognizes that Croft does not teach the dimensions of the holes as claimed. Thus, the Office Action cites *In re Gardner v. TEC Systems, Inc.*, to remedy this deficiency of Croft, quoting from MPEP § 2144.04(IV)(A). *In re Gardner* does indeed state that

Where the **only difference** between the prior art and the claims was a recitation of **relative dimensions** of the claimed device **and** a device having the claimed relative dimensions **would not perform differently** than the prior art device, the claimed device was not patentably distinct from the prior art device.

(Emphasis added.) However, first, for *In re Gardner* to apply, the **only difference** between the prior art and the claims must be a recitation of relative dimensions. As noted above, there is more than ***only one difference*** between the claimed invention and the cited references: the cited references are not used for or able to bond semiconductor wires. Second, for *In re Gardner* to apply, assuming *arguendo* that the only difference was a difference in dimensions, this difference is not a recitation of **relative** dimensions. As noted above, the dimensions claimed are **not relative** to the dimensions taught in Croft. The dimensions are radically different by perhaps two orders of magnitude. Third, for *In re Gardner* to apply, “the device having the claimed relative dimensions would **not perform differently** than the prior art devices.” Applicants respectfully submit that, again, the method as claimed produces tools for semiconductor wire bonding, while the holes of Croft are used for suction cupping substrates via the formation of a vacuum by vacuum port 18 so that those substrates may be handled. Thus, the device having the claimed alleged relative dimensions performs differently from the prior art, and is, therefore, not obvious.

Applicants respectfully submit that the third requirement of MPEP § 2143 cannot be satisfied vis-à-vis claims 2, 10, 12-15 by mere reliance on *In re Gardner* to remedy the deficiencies of the cited references, and thus these claims are allowable.

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In sum, even if the first requirement of MPEP § 2143 is satisfied, the third requirement of MPEP § 2143 is not satisfied in the Office Action, since the cited references do not teach each and every element of the present invention. Thus, the present claims are allowable.

Lack of Suggestion or Motivation to Modify or Combine the References

MPEP § 2143.01, entitled *Suggestion or Motivation to Modify the References*, states that the “prior art *must* suggest the desirability of the claimed invention.” (emphasis added; citations omitted) It further states that obviousness

can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art.

(Citations omitted.)

Claims 1, 3-6 and 11: In regard to the combination of Huggins with Sugiyama, Applicants acknowledge that Huggins does proffer that his feedstock can be utilized with rapid firing techniques without additional hardening states. Still, Huggins is completely silent in even suggesting that the feedstock of Huggins would be appropriate for making semiconductor wire bonding tools. Moreover, even if such a suggestion or teaching existed in Huggins, the skilled artisan would still not know how to utilize the feedstock of Huggins to control the dimensions of the sintered material to produce a wire bonding tool (this point is even more pertinent in regard to a bonding tool having the recited dimensions of claims 2, 10 and 12-15). In sum, there is a distinct lack of suggestion in Huggins to combine Huggins with Sugiyama.

Claims 2, 10, 12-15: In regard to the rejection of claims 2, 10, 12-15, one of ordinary skill in the art would not combine Croft with the combination of Huggins and Sugiyama, and no **motivation to do so is proffered in the Office Action**. Furthermore, as noted above, the skilled artisan would not know how to utilize the feedstock of Huggins to control the dimensions of the sintered material to produce a wire bonding tool having the dimensions as claimed.

Also, combining Croft with Sugiyama would change the principle of operation of Sugiyama, a result that is forbidden by MPEP § 2143.01, subsection 6. That section states “the proposed modification cannot change the principle of operation of a reference – If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810 (CCPA 1959).” In *Ratti*, the CCPA held that the “suggested combination of references would require a substantial reconstruction and redesign of the elements shown in the primary reference.” This substantial redesign would have resulted in changing a rigid seal to a resilient seal. Thus, a reference cannot be modified to render an invention obvious if the modification changes the principle of operation of the reference, **even if that modification is workable or easily implemented**.

With the above in mind, it is respectfully submitted that since the teachings of Croft rely on vacuum suction to manipulate substrates, substituting the vacuum port of Croft for the mechanical jigs of Sugiyama would change the principle of operation of Sugiyamat. Since modifying Sugiyama to utilize a vacuum port changes the principle of operation of Sugiyama, just as changing the rigid seal to a resilient seal was found to change the principle of operation in *Ratti*, “the teachings of Sugiyama are **not sufficient** to render the claims *prima facie* obvious.” (MPEP § 2143.01, emphasis added.)

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Further in regard to the rejections of claims 2, 10 and 12-15 in view of the first requirement of MPEP § 2143.01, Applicants respectfully traverse the Office Action’s

assertion that the claimed “parameters would have obviously been selected to optimize the process conditions and/or the properties of the final product.” Applicants submit that the skilled artisan would not find it obvious to reduce the diameters of Croft to anything close to 10 micrometers. As noted above, the diameters claimed are very small. Applicants respectfully submit that the selection of such diameters for use in the vacuum port of Croft would **not** result in optimization of the product of Croft.

In formulating the optimization rationale for disallowing the claims, it appears that the Office Action relies on common knowledge in the art, as is discussed and permitted in MPEP § 2144.03, to satisfy the first requirement of MPEP § 2143. However, Applicants note that § 2144.03 allows an applicant “to traverse such an assertion,” and that when an applicant does so, “the examiner should cite a reference in support of his or her position.” (MPEP § 2144.03, second paragraph.) Applicants hereby traverse the assertion that it would have been common knowledge in the art that vacuum ports having a diameter of 10 micrometers or thereabouts would optimize the design of Croft. **Applicants thus request, relying on § 2144.03 that the PTO cite a reference and exactly identify where such a reference teaches the alleged optimization.**

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In summary, because of the lack of suggestion or motivation in the prior art to modify the reference, the first requirement of MPEP § 2143 has not been met and, hence, a *prima facie* case of obviousness has not been established.

Lack of a Reasonable Expectation of Success

MPEP § 2143.02 permits references to be modified or combined to reject a claim as obvious **only** if there is a reasonable expectation of success. There is no evidence in the references, and certainly none identified in the Office Action, that one of ordinary skill in the art would have a reasonable expectation of success in achieving Applicants’ invention by combining Huggins with Sugiyama. For example, the references are silent in regard to teaching a method of controlling the shrinkage of the sintered material to obtain the tiny components. That is, the skilled artisan would not reasonably expect success in making tools

as claimed because the artisan would not know how to properly control shrinkage of the feedstock of Huggins.

Thus, one of ordinary skill in the art would not see the combination of the references as successfully producing acceptable tools or blanks for such tools. Because of this, the second criteria of MPEP § 2143 has not been met in the Office Action, a *prima facie* case of obviousness has therefore not been established.

New Claims

As can be seen above, Applicants have added new claims 16-18. These claims recite specific configurations of the tools that are made from the dense end products of reduced dimensions. These claims are allowable at least due to their dependency from claim 1, and do to the fact that the cited references fail to teach the additional recitations of claims 16, 17 and 18. Support for these claims may be found in the pending claims, and in the specification, among other places, at paragraph 0062.

Allowance of these new claims is respectfully requested.

Conclusion

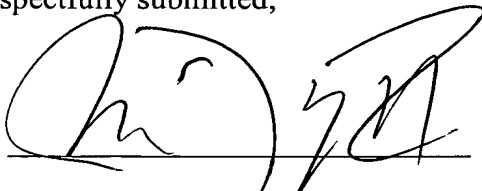
Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application is respectfully requested.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Examiner Fiorilla is invited to contact the undersigned by telephone if it is felt that a telephone interview would expedite allowance of the application.

Respectfully submitted,

Date June 03, 2004

By 

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